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10/607,591	06/27/2003	Mark Ronald Plesko	3382-64706	5996

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EXAMINER

PHAM, CHRYSTINE

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2192

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/607,591

Applicant(s)

PLESKO ET AL.

Examiner

Christine Pham

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 11 July 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,3-10,12-15,17-24 and 26-32 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,3-10,12-15,17-24 and 26-32 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>07/11/2007&09/14/2007</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. This action is responsive to Amendments filed on July 11, 2007. Claims 12 and 24 have been amended. Claim 25 has been canceled. Claims 1, 3-10, 12-15, 17-24, 26-32 are presented for examination.

Response to Arguments

2. Applicant's arguments filed July 11, 2007 have been fully considered but they are not persuasive.

Applicants first contend, Knoblock does not disclose type checking (Remarks, page 9, 2nd full paragraph). However, Applicants later admit that col.6:25-29 of Knoblock discloses "the debugger .. adapted for type checking the intermediate program" (Emphasis added) (Remarks, bottom of page 9 through top of page 10). Thus, Applicants' argument is not persuasive.

Applicants further contend that "using Knoblock's solution for reconstructing type information, the type checking would use reconstructed types (i.e., known types) (Remarks, top of page 10). However, contrary to Applicants' argument, certain unknown types in Knoblock's intermediate program (see at least *unknown types, intermediate program* col.8:25-30) remain unknown for the type checking (see at least *unknown element types, disregarding* col.13:35-52).

In other words, Knoblock's reconstructed types comprise both known and unknown types.

Applicants further contend that Knoblock does not teach "a type checker for applying one or more rule sets ..." (Remarks, page 10, 2nd full paragraph). However, it is inherent that type checking involves at least one or more rule sets, which is used to determine (i.e., compare and/or analyze) whether a particular variable is treated as having the same data type as it was declared to have. Furthermore, Knoblock discloses collecting constraints (i.e., rules) for known types (see at least col.7:20-45; col.8:19-30) and unknown types of the intermediate program (see at least col.13:35:60). Knoblock further discloses computing a set of solutions (i.e., how to) to determine unknown types (i.e., type check unknown types) from the set of constraints (i.e., rules) (see at least col.12:60-col.13:60). Thus, Knoblock clearly teaches a type checker for applying one or more rule sets.

Applicants further contend that Knoblock does not teach "selectively retaining type information ..." (Remarks, page 10). However, as discussed above, Knoblock's type reconstruction disregards unknown element types if two unknown array types are not an array type (see at least col.13:35-52). It is clear that unknown array types remain unknown types, that is to say, unknown array types do not have any type information retained (i.e., reconstructed).

Applicants further contend that Franz does not teach "wherein the size represents size of a machine representation of type designated as the unknown type" (Remarks, page 12). However, as established in the previous Office Action (page 8), at least col.11:63-col.12:11 Franz discloses type checking for array types. It is inherent that each variable of type array has a size associated with it. It is further inherent the value of the size (i.e., a numeric value) is represented by the computer (i.e., machine representation) because without a machine representation (i.e., machine recorded or stored) of the size, it is impossible for Franz to determine the legal range for the array (i.e., matching type safe-index-arr).

3. In view of the foregoing discussion, rejection of claims under 35 USC 102(e) and 103(a) is considered proper and maintained.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application

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filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

5. Claims 1, 3-8, 14, 17-23, 29-31 are rejected under 35 U.S.C. 102(e) as being anticipated by Knoblock et al. (US 6981249 B1, "Knoblock").

Claim 1

Knoblock teaches a method of type-checking a code segment written in a programming language (see at least *type checking, compiler, interpreter* col.5:30-col.6:32) comprising:

translating the code segment from the programming language to one or more representations of an intermediate language (see at least *intermediate program* col.1:63-col.2:52; *translator 204, source program 202, bytecode program 206, intermediate program 210* col.5:30-col.6:32; 402 FIG.4 & associated text); and type-checking the one or more representations based on a rule set (see at least FIG.12 & associated text; *constraints, type reconstruction* col.14:4-24), wherein the rule set comprises rules for type-checking a type designated as the unknown type (see at least *bytecode program 206 lacks some of the types, reconstruct, type inference, type elaboration* col.5:55-col.6:2), wherein the unknown type indicates that an element of the representation is of a type that is not known (see at least *unknown type, intermediate program* col.1:63-col.2:52; *type reconstruction, type variable, unknown type* col.8:4-19; FIG.4 & associated text; col.13:35-52; col.7:20-45; col.8:19-30).

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Claim 3

The rejection of base claim 1 is incorporated. Knoblock further teaches wherein the rule set is selected from a plurality of rule sets (see at least *minimal solution, set of solutions* col.14:20-24; FIG.12 & associated text).

Claim 4

The rejection of base claim 3 is incorporated. Knoblock further teaches wherein only a fraction of the plurality of rule sets contain rules for type-checking a type designated as the unknown type, wherein the unknown type indicates that an element of the representation is of a type that is not known (see at least *data member constraint 1202, data member 1204, unknown type* col.14:13-15).

Claim 5

The rejection of base claim 1 is incorporated. Knoblock further teaches wherein the rule set further comprises rules for type-checking types representing categories of types found in a plurality of programming languages (see at least *data member constraint 1202, data member 1204, unknown type, known type* col.14:13-15; FIG.12 & associated text);

Claim 6

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Knoblock teaches a method of selectively retaining type information during compilation in a code segment written in a programming language (see at least *constructing* 412 FIG.4 & associated text), the method comprising:

translating the code segment from the programming language to one or more representations of an intermediate language (see at least 402 FIG.4 & associated text); for each representation, determining whether to retain type information for one or more elements of the representation; and based on the determination, associating one or more elements of the representation with a type, designated as the unknown type, indicating the element can be of any type (see at least *type reconstruction, type variable, unknown type, solution, new type* col.8:4-55; FIG.4 & associated text; col.13:35-52).

Claim 7

The rejection of base claim 6 is incorporated. Knoblock further teaches wherein the determination is based on a current stage of compilation, a characteristic of each representation, or the programming language (see at least *type reconstruction, type variable, unknown type, solution, new type* col.8:4-55; FIG.4 & associated text).

Claim 8

The rejection of base claim 6 is incorporated. Claim recites limitations, which have been addressed in claims 2 and 4, therefore, is rejected for the same reasons as cited in claims 2 and 4.

Claim 14

Claim recites limitations, which have been addressed in claims 1-7, 9 and 10, therefore, are rejected for the same reasons as cited in claims 1-7, 9 and 10.

Claim 29

Knoblock teaches a computer-readable medium containing computer-executable instructions for implementing the method of claim 1 (see at least FIGS.2A-2B & associated text).

Claim 30

The rejection of base claim 1 is incorporated. Knoblock further teaches wherein the rule set further comprises rules for dropping type information for one or more elements of the representation by changing a known type of the one or more elements to the type designated as the unknown type (see at least _FIG.3B & associated text; *type, local variable, constraint collection, type reconstruction, type variable, unknown type* col.7:20-col.8:55).

Claim 31

The rejection of base claim 6 is incorporated. Claim recites limitations, which have been addressed in claim 30, therefore, is rejected for the same reasons as cited in claim 30.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 9, 10, 12-13, 15, 24-28 and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Knoblock et al. (US 6981249 B1, "Knoblock") in view of Franz et al. of record (US 7117488 B1, "Franz").

Claim 9

The rejection of base claim 6 is incorporated. Knoblock further teaches wherein the type, designated as the unknown type, indicating the element can be of any type (e.g., array)(see at least *type variable, unknown type, integer types, Booleans, bytes, shorts* col.8:4-47; *unknown array types* col.13:35-40). Knob does not expressly disclose said element (i.e., array) has size information associated with it. However, Franz teaches indicating an element can be of type array and has size information associated with it (see at least *array, size* col.11:63-col.12:11). Knoblock and Franz are analogous art because they are both directed to type checking. It would have been obvious to one of ordinary skill in the pertinent art at the time the invention was made to incorporate the

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teaching of Franz into that of Knoblock for the inclusion of size information associated with array types. And the motivation for doing so would have been enforce type safe code (see at least Franz col.1:55-col.2:55).

Claim 10

The rejection of base claim 9 is incorporated. Knoblock further disclose generating code from at least elements associated with the type, designated as the unknown type indicating the element can be of any type)(see at least *type variable, unknown type, integer types, Booleans, bytes, shorts* col.8:4-47; *unknown array types* col.13:35-40). Knoblock does not expressly disclose said indicating is based on the size information. However, indicating the element can be of any type based on the size information of a machine representation (see at least *array, size* col.11:63-col.12:11).

Claim 12

Knoblock teaches a method of translating types associated with a plurality of programming languages to types of an intermediate language (see at least FIG.4 & associated text; *type reconstruction, type variable, local variable* col.8:4-55), the method comprising:

replacing the types associated with the plurality of programming languages with the types of the intermediate language, wherein the types of the intermediate language comprise general categories of the types associated with the plurality of programming languages and a type designated as an unknown type (see at least 502, 504 FIG.5 &

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associated text), wherein the type designated as the unknown type has size information associated with it, wherein the size information comprises size information of a machine representation of the type designated as the unknown type (see at least col.11:63-col.12:11).

Claim 13

The rejection of base claim 12 is incorporated. Knoblock further teaches wherein the types of the intermediate language further comprise types related to programming language specific primitive types (see at least 414 FIG.4 & associated text; col.8:43-55).

Claims 15 and 32

Claims recite limitations, which have been addressed in claim 10, therefore, therefore, are rejected for the same reasons as cited in claim 10.

Claims 24-27

Claims recite limitations, which have been addressed in claims 1-7, 9 and 10, therefore, are rejected for the same reasons as cited in claims 1-7, 9 and 10.

Claim 28

Knoblock teaches a computer-readable medium containing computer-executable instructions for implementing the method of claim 24 (see at least FIGS.2A-2B &

associated text).

Conclusion

8. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Chrystine Pham whose telephone number is 571-272-3702. The examiner can normally be reached on Mon-Fri, 8:30am-5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tuan Q. Dam can be reached on 571-272-3695. The fax

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phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



TUAN DAM
SUPERVISORY PATENT EXAMINER